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FIG. 1

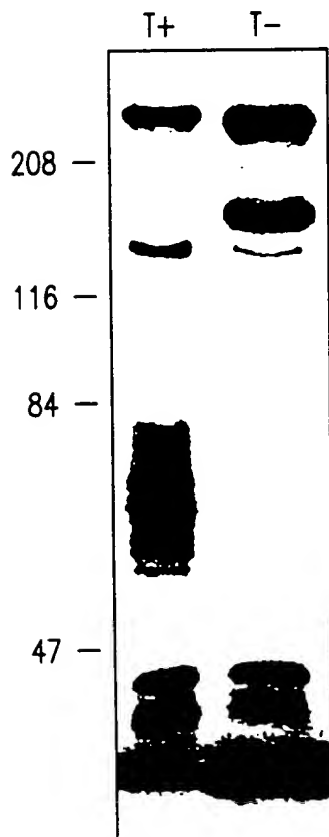
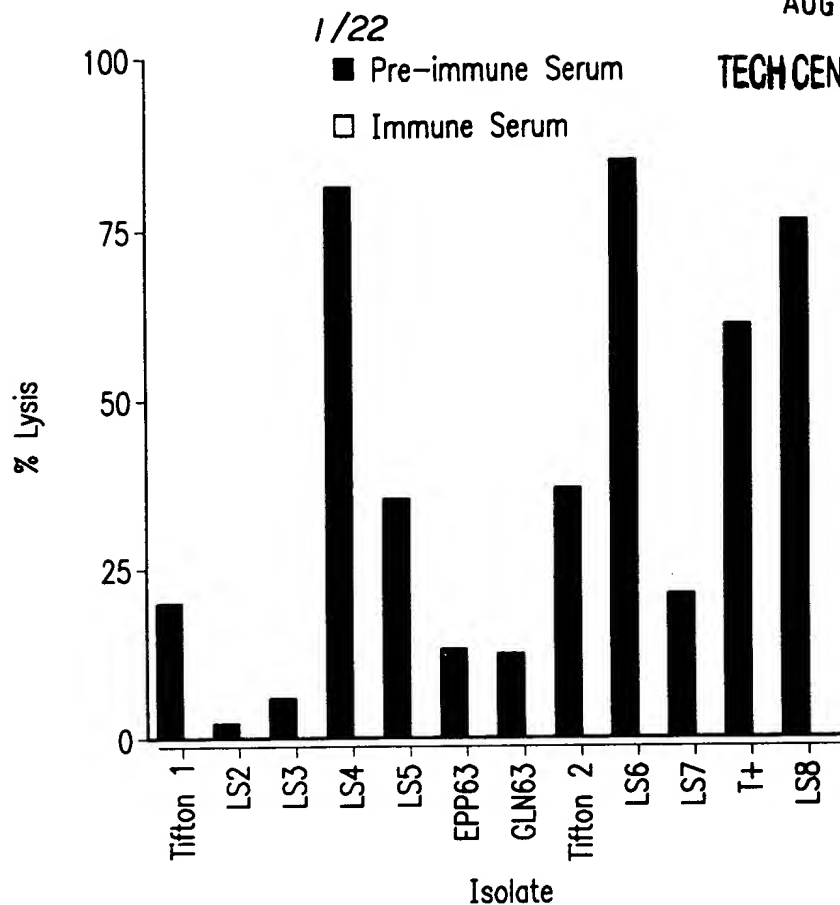


FIG. 2

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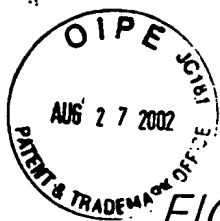
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FIG. 3-1

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1 ATGTCCAATATAAATGTAATTAAATCTAATATTCAAGCAGGCTTGAATTCAACAAAGTCT 60
1 M S N I N V I K S N I Q A G L N S T K S 20
61 GGATTAATAAATCTTTACTTGGCTATTCCCAAAGATTATGATCCGCAAAAAGGTGGGACT 120
21 G L K N L Y L A I P K D Y S D P Q K G G T 40
121 TTAAATGATTTTATTAAGCTGCTGATGATTAAGGTAATGCTGTTTACGAGAAGAGCCT 180
41 L N D F E K A A D E L G I A R L A E E P 60
181 AATCACA CTGAAACAGCAAAAAAATCTGTTGACACAGTAAATCAGTTTCTCTCTCTCACA 240
61 N H T E T A K K S V D T V N Q F L S L T 80
241 CAAACTGGTATTGCTATTTCTGCAACAAAATTAGAAAAGTTCTTACAAAAACATTCTACC 300
81 Q T G I A I S A T K L E K F L Q K H S T 100
301 AATAAGTTAGCCAAAGGGTTAGACAGTGTAGAAAATATTGATCGTAAATTAGGTAAAGCA 360
101 N K L A K G L D S V E N I D R K L G K A 120
361 AGTAATGTATTATCAACATTAAGCTCTTTTTTGGGCACTGCATTAGCGGGTATAGA ACTT 420
121 S N V L S T L S S F L G T A L A G I E L 140
421 GATTCTTTAATCAAAAAAGGTGATGCTGCACCTGATGCTTTGGCTAAAGCTAGTATTGAC 480
141 D S L I K K G D A A P D A L A K A S I D 160
481 TTGATTAATGAGATAATTGGTAATCTATCTCAGAGTACTCAAACGATTGAAGCATTTTCT 540
161 L I N E I I G N L S Q S T Q T I E A F S 180
541 TCACAGTTAGCAAAGTTAGGTTCTACTATATCGCAGGCTAAAGGCTTCTCTAATATAGGA 600
181 S Q L A K L G S T I S Q A K G F S N I G 200
601 AACAAAGTTGCAAACTTAAATTTTTCTAAAACAAATCTTGGTTTGGAAATAATTACTGGT 660
201 N K L Q N L N S S K T N L G L E I I T G 220
661 TTGCTATCAGGCATTTCTGCAGGCTTTGCTTTAGCGGATAAAAAATGCATCGACTGGCAAA 720
221 L L S G I S A G F A L A D K N A S T G K 240
721 AAAGTTGCTGCAGGTTTTGAATTAAGCAATCAAGTTATTGGTAATGTAACAAAAGCAATT 780
241 K V A A G F E L S N Q V I G N V T K A I 260
781 TCTTCATATGTTTTAGCACACGTGTTGCTGCTGGTCTATCAACTACTGGTGCTGTTGCT 840
261 S S Y V L A Q R V A A G L S T T G A V A 280
841 GCTTTAATTACTTCATCGATTATGTTGGCAATTAGTCCTTTGGCATTATGAATGCAGCA 900
281 A L I T S S I M L A I S P L A F M N A A 300
901 GATAAATTCATCATGCTAATGCTCTTGATGAGTTTGCAAAACAATTCCGAAAATTTGGC 960
301 D K F N H A N A L D E F A K Q F R K F G 320



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FIG. 3-2

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961 TATGATGGGGATCATTTATTGGCTGAATATCAGCGTGGTGTGGGTACTATTGAAGCTTCA 1020
321 Y D G D H L L A E Y Q R G V G T I E A S 340

1021 TTAAC TACAATTAGTACGGCATTAGGTGCAGTTTCTGCTGGTGTTCGCTGCTGCTGTA 1080
341 L T T I S T A L G A V S A G V S A A A V 360

1081 GGATCTGCTGTTGGTGCACCGATTGCACTATTAGTTGCAGGTGTTACAGGATTGATCTCT 1140
361 G S A V G A P I A L L V A G V T G L I S 380

1141 GGAATTTTAGAAGCGTCTAACAGGCAATGTTTGAAAGTGTGCTAACCGTTTACAAGGT 1200
381 G I L E A S K Q A M F E S V A N R L Q G 400

1201 AAAATTTTAGAGTGGGAAAAGCAAATGGCGGTCAGAACTATTTTGATAAAGGCTATGAT 1260
401 K I L E W E K Q N G G Q N Y F D K G Y D 420

1261 TCTCGTTATGCTGCTTATTTAGCTAATAACTTAAATTTTGTCTGAGCTAAATAAAGAG 1320
421 S R Y A A Y L A N N L K F L S E L N K E 440

1321 TTGAAGCTGAACGTGTTATTGCAATCACCCAACAACGTTGGGATAATAATATTGGTGAG 1380
441 L E A E R V I A I T Q Q R W D N N I G E 460

1381 TTAGCAGGTATTACCAAATTGGGTGAACGCATTAAGAGCGGAAAAGCTTATGCAGATGCT 1440
461 L A G I T K L G E R I K S G K A Y A D A 480

1441 TTTGAAGATGGCAAGAAAGTTGAAGCTGGTTCCAATATTACTTTGGATGCTAAACTGGT 1500
481 F E D G K K V E A G S N I T L D A K T G 500

1501 ATCATAGACATTAGTAATTCAAATGGGAAAAAAACGCAAGCGTTGCATTTCACTTCGCCT 1560
501 I I D I S N S N G K K T Q A L H F T S P 520

1561 TTGTTAACAGCAGGAAC TGAATCACGTGAACGTTTAACTAATGGTAAATACTCTTATATT 1620
521 L L T A G T E S R E R L T N G K Y S Y I 540

1621 AATAAGTTAAATTCGGACGTGTAAAAAACTGGCAAGTTACAGATGGAGAGGCTAGTTCT 1680
541 N K L K F G R V K N W Q V T D G E A S S 560

1681 AAATTAGATTTCTCTAAAGTTATTCAGCGTGTAGCCGAGACAGAAGGCACAGACGAGATT 1740
561 K L D F S K V I Q R V A E T E G T D E I 580

1741 GGTCTAATAGTAAATGCAAAAGCTGGCAATGACGATATCTTTGTTGGTCAAGGTAAATG 1800
581 G L I V N A K A G N D D I F V G Q G K M 600

1801 AATATTGATGGTGGAGATGGACACGATCGTGTCTTCTATAGTAAAGACGGAGGATTTGGT 1860
601 N I D G G D G H D R V F Y S K D G G F G 620

1861 AATATTACTGTAGATGGTACGAGTGCAACAGAAGCAGGCAGTTATACAGTTAATCGTAAG 1920
621 N I T V D G T S A T E A G S Y T V N R K 640



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FIG. 3-3

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1921 GTTGCTCGAGGTGATATCTACCATGAAGTTGTGAAGCGTCAAGAAACCAAGGTGGGTAAA 1980
641 V A R G D I Y H E V V K R Q E T K V G K 660

1981 CGTACTGAAACTATCCAGTATCGTGATTATGAATTAAGAAAAGTTGGGTATGGTTATCAG 2040
661 R T E T I Q Y R D Y E L R K V G Y G Y Q 680

2041 TCTACCGATAATTTGAAATCAGTAGAAGAAGTAATGGTTCTCAATTAATGATGTATTC 2100
681 S T D N L K S V E E V I G S Q F N D V F 700

2101 AAAGGTTCTAAATTCAACGACATATTCCATAGTGGTGAAGGTGATGATTTACTCGATGGT 2160
701 K G S K F N D I F H S G E G D D L L D G 720

2161 GGTGCTGGTGACGACCGCTTGTTTGGTGGTAAAGGCAACGATCGACTTTCTGGAGATGAA 2220
721 G A G D D R L F G G K G N D R L S G D E 740

2221 GGCGATGATTTACTCGATGGCGTTCTGGTGATGATGATTAAATGGTGGTCTGGTAAT 2280
741 G D D L L D G G S G D D V L N G G A G N 760

2281 GATGTCTATATCTTTCGAAAGGTGATGGTAATGATACTTTGTACGATGGCACGGGCAAT 2340
761 D V Y I F R K G D G N D T L Y D G T G N 780

2341 GATAAATTAGCATTTGCAGATGCAATATATCTGATATTATGATTGAACGTACCAAAGAG 2400
781 D K L A F A D A N I S D I M I E R T K E 800

2401 GGTATTATAGTTAAACGAAATGATCATTGAGGTAGTATTAACATACCAAGATGGTACATA 2460
801 G I I V K R N D H S G S I N I P R W Y I 820

2461 ACATCAAATTTACAAAATTATCAAAGTAATAAAACAGATCATAAAATTGAGCAACTAATT 2520
821 T S N L Q N Y Q S N K T D H K I E Q L I 840

2521 GGTAAAGATGGTAGTTATATCACTTCCGATCAAATTGATAAAATTTGCAAGATAAGAAA 2580
841 G K D G S Y I T S D Q I D K I L Q D K K 860

2581 GATGGTACAGTAATTACATCTCAAGAATTGAAAAAGCTTGCTGATGAGAATAAGAGCCAA 2640
861 D G T V I T S Q E L K K L A D E N K S Q 880

2641 AAATTATCTGCTTCGGACATTGCAAGTAGCTTAAATAAGCTAGTTGGGTCAATGGCACTA 2700
881 K L S A S D I A S S L N K L V G S M A L 900

2701 TTTGGTACAGCAAATAGTGTGAGTTCTAACGCCTTACAGCCAATTACACAACCAACTCAA 2760
901 F G T A N S V S S N A L Q P I T Q P T Q 920

2761 GGAATTTTGGCTCCAAGTGTTTAG SEQ ID NO. 1 2784
921 G I L A P S V * SEQ ID NO. 2 928



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MbxA	38
Lkta	59
ApXIIA	62
H1YA	61
MbxA	103
Lkta	121
ApXIIA	125
H1YA	124
MbxA	163
Lkta	180
ApXIIA	185
H1YA	189
MbxA	227
Lkta	245
ApXIIA	250
H1YA	253
MbxA	292
Lkta	310
ApXIIA	315
H1YA	318
MbxA	357
Lkta	375
ApXIIA	380
H1YA	383

FIG. 4-1



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FIG. 4-2

MbxA	AAAGSARGAP	IAALVAGVIG	ELSGLEASK	QAMFEHVASK	LOGKLEMEK	QNGQNYEDK	EYDSR	422
Lkta	AAAGSVIASP	IAALVSGITG	VISTLEONSK	QAMFEHVASK	INHKTVEWEK	NNHCKNYEEN	BYDAR	440
ApXIIA	ASAGSLAGAP	VALLVAGVIG	ELITTELEASK	QAMFEHVASK	VHBRVEMEKEK	.KHKNVYEQ	GVBSP	444
H1YA	AAATTSVAGAP	VSAIVGANVIG	ELISGLEASK	QAMFEHVASK	MADVLAEMEKEK	.KHGKNVYFEN	GYDAR	447
peak 23								
MbxA	YAAVLAANLK	ELSELNKELE	AERVIALTOO	RHDNNICEA	BITKIGERIK	SGKAYADAFE	DERKV	487
Lkta	YLANLODNMK	ELNLNKELO	AERVIALTOO	QHDNNTGDLEA	QTSRCEKMLE	SGKAYADAFE	EGKHI	505
ApXIIA	HLADLODNMK	ELNLNKELO	AERVIALTOO	RHDNNTGDLEA	AHSRTDKIS	SGKAYADAFE	EGDHO	509
H1YA	HAALFEDNFK	ELSOYNKEYS	VERSVLLTOO	HWDITLGELEA	GMTRNGDNTLE	SGKSNIDVYME	EGKRL	512
*								
MbxA	EEAG....SNI	TEPARIGLETD	LSNSNGKXIQ	ALHETSPLT	AGTBSRRLI	NEKNSLTKNK	KESRV	548
Lkta	KAG....KLM	QDSANGITD	VNSNGKAKIQ	HILLERITPLT	PGTEHRRVQ	TEKMEYITKIL	NNRV	566
ApXIIA	SYD....SSM	QDNKNGITIN	ISNTNR.KIQ	SVLERITPLT	PGCEENRERIQ	EGKNSLTKIL	HIDRV	569
H1YA	EEKPDEFQKQ	VFDPLKGNID	LSDS..KSST	LEKREITPLT	PGCEERERQ	SGKSNIDVYME	LVKGM	575
1								
MbxA	KNWQVTD..GE	ASSKLDIESKM	IORVA...ET	EQ....TDEI	GLIIVNAKAGN	DDIFRYGQCKM	NEDGG	605
Lkta	DSMKITTD..GA	ASSITFDLTNY	VORIGIELDN	AGNVTIKKET	KITAKI GEGD	DNVFEVGGGFI	ETDGG	630
ApXIIA	DSNVTYTD..GD	ASSSVDETNY	VORLAVKFD	AGNIIIESKOT	KITANIGAGN	DNVFEVGGSSIN	VNDGG	633
H1YA	QKQIVKGVQD	KGSVYVYSNJL	IQHASV....	.EN.NQYREI	RHESHGDSGD	DKHEL SAGSA	KELIYAG	634
*								
MbxA	QGHORVHYYSK	DGGFENJIMP	GTSAREAGSY	LYNRK..ARG	DIYHEVWVRQ	ETKIGKRITET	TDYRD	669
Lkta	EGYDRVHYYSR	.ENKGALETD	ATKEFEOSY	LYNRFM..ETE	KACHEVITSSEH	TALGNREK	DEVR.	692
ApXIIA	QGHORVHYYSR	.GEYBALVID	ATAEFKESY	SNKRYM..GDS	KALHETIAH	QDNVBNREK	DEVR.	695
H1YA	KGHVVMYVDK	T.DTGYLETD	GEKATFAGNY	LYTVLVLQGV	KVLEQVYKEQ	EVSVSKRTER	TOVRS	698



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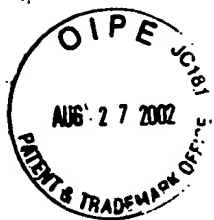
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peak 26

MbxA	YELRKV.GYG	QOSTDNIEKSV	EEVITGSGEND	VEKGSKEEND	FHSCEEDPLL	BGGASDRL	GGKGN	733
Lkta	HSNNQH.HAG	MYTKDTLXAN	EEVITGSHND	TFKGSKEEDA	FNGGDEVDIT	BGNNDNDRL	GGKGD	756
ApXIIA	REDDRF.HTG	YVIVDSLKSV	EEVITGSHND	TFKGSKEEDA	FNGGDEVDIT	BGNNDNDRL	GGKGD	759
H1YA	YEFTHINGKN	LEITDNLYSV	EEVITGSHND	TFKGSKEEDA	FNGGDEVDIT	BGNNDNDRL	GGKGD	763
MbxA	DRISGDEGD	.....	.....	.....	.....	.....	.....	742
Lkta	DILGGGND	.....	.....	.....	.....	.....	.....	765
ApXIIA	DITGGGNGN	.....	.....	.....	.....	.....	.....	768
H1YA	DITSGGNGDD	QLYGGDGNK	LIGGAGNNYL	NGGDGDELQ	VQNSLAKNV	LSGGKGNKDL	YGSEG	828
MbxA	DILGGGSGD	DMINGGAGND	WVIFRKGCGN	DTILYEGTG.N	DKLAFADANL	SPMTERKE	GIIVK	805
Lkta	.DITGGGKGN	DILHGGKGD	TFVHRKGCGN	DTILYEGTG.N	DKLAFADANL	SPMTERKE	GIIVK	827
ApXIIA	.NFEVGTGN	DITSGGKND	TFVHRKGCGN	DTILYEGTG.N	DKLAFADANL	SPMTERKE	GIIVK	830
H1YA	ADLGGGEGN	DITSGGKND	TFVHRKGCGN	DTILYEGTG.N	DKLAFADANL	SPMTERKE	GIIVK	893
MbxA	RND.....	HSGSINIPRW	Y.....ITSNL	QVQSNKTDH	KTEOLIGKDG	SVTSGQIDK	TEQDK	859
Lkta	TNS.....	KKEKVTQNN	FEADFAKEV	PNYKATGDE	KTEOLIGKDG	SVTSGQIDK	TEQDK	882
ApXIIA	INQ.....	KGEKVRIGNN	FEADFAKEV	PNYKATGDE	KTEOLIGKDG	SVTSGQIDK	TEQDK	885
H1YA	KAEKNVLSIG	HKNGITFKNN	FEADFAKEV	PNYKATGDE	KTEOLIGKDG	SVTSGQIDK	TEQDK	949
MbxA	KDGTVITSG	KKLADENKS	QKLSASDIAS	SENKENGMA	LFGTANSVSS	NALQPIQPT	QGIDA	924
Lkta	KNGKLEQDE	ESKVDNTEL	LK.HSKNVTN	SLDKLSSVS	AF.FSNDSP	NVE..VA.PT	SMED	941
ApXIIA	ENNOESAEA	ESKVDNTEL	LK.HSKNVTN	SLDKLSSVS	AF.FSNDSP	NVE..VA.PT	SMED	945
H1YA	QSNK.AEIV	YGNDAIAYGS	SK.DRONVSN	SLDKLSSVS	AF.FSNDSP	NVE..VA.PT	SMED	1011
MbxA	PRV.....	.....	.....	.....	.....	.....	.....	927
Lkta	QSLSLQFAR	AA	953
ApXIIA	VS.NINQFAR	AA	956
H1YA	YGRNSHLETA	SA	1023

FIG. 4-3



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FIG. 5

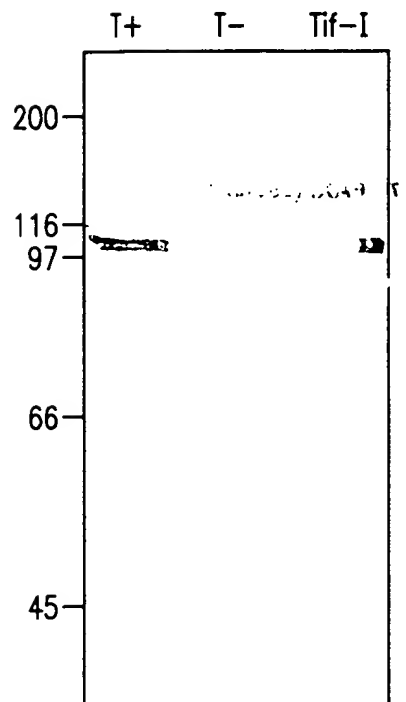
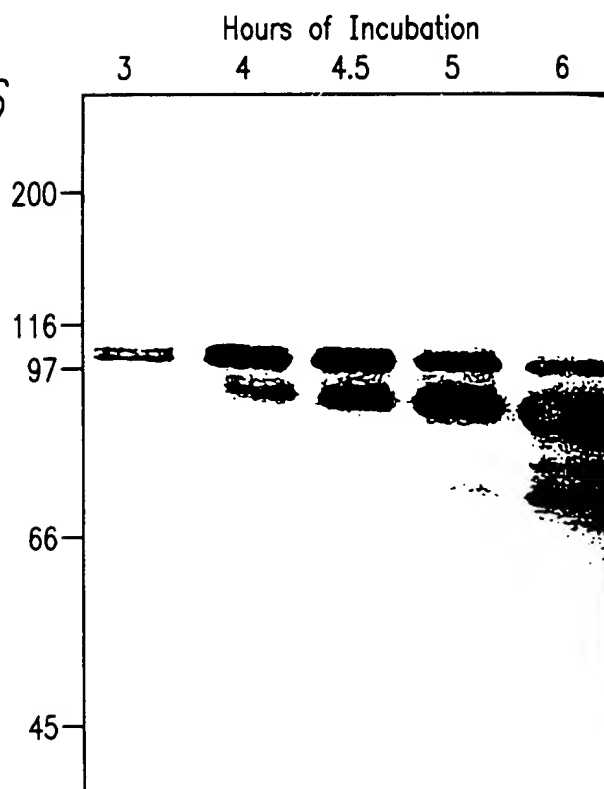


FIG. 6





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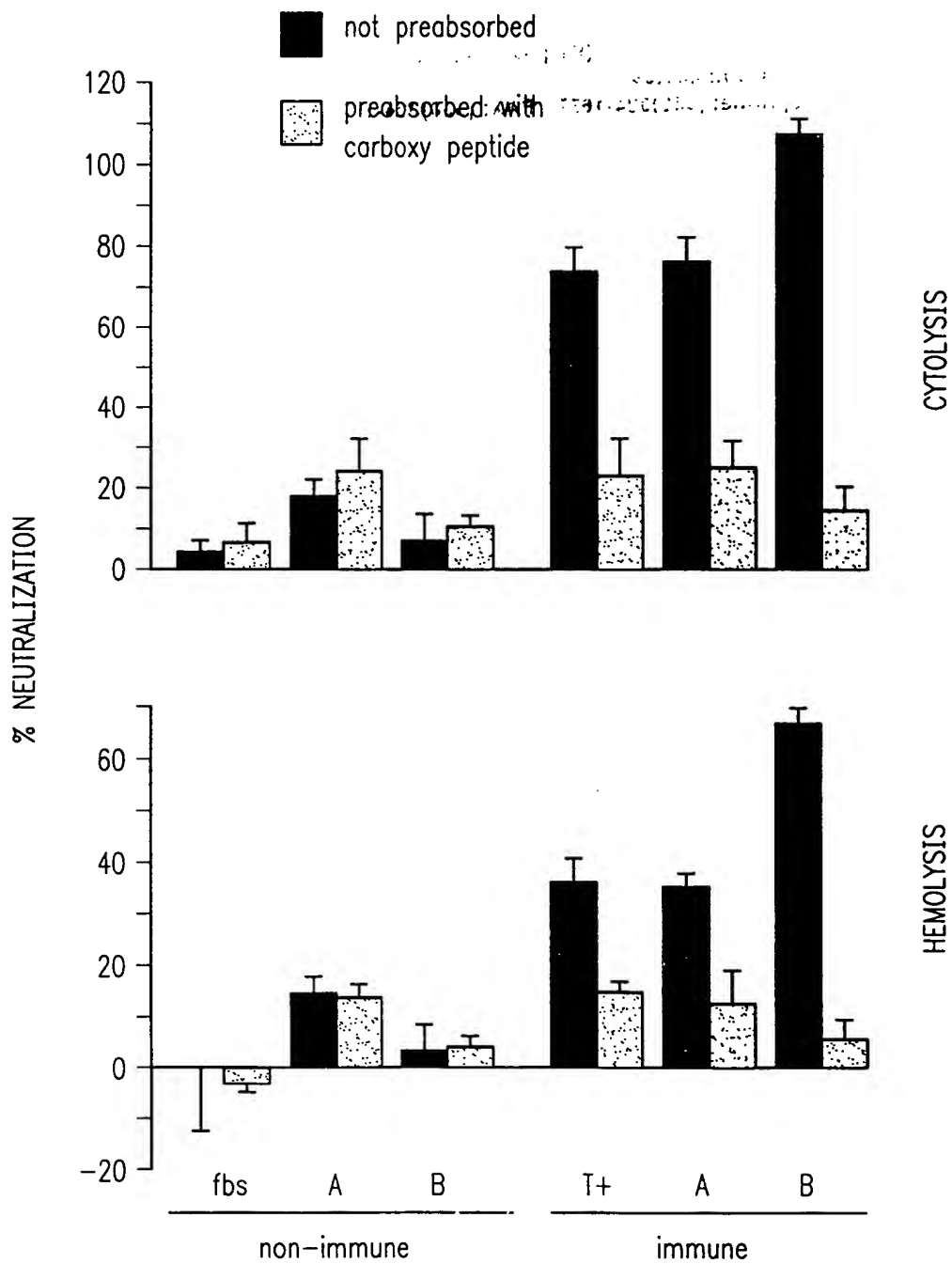


FIG. 7



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FIG. 8-1

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1 ATGGGTGGTGATACTTCTTTAATTAGACTTAATTTACAAACCCTTAATAGTAATTTAGTT 60
1 M G G D T S L I R N L Q T L N S N L V 20

61 ATGATAGATTATGCTCAACAACCTGCTCTATCTGCTCTGGTTATCCTTGCCAAATACTAT 120
21 M I D Y A Q Q P A L S A L V I L A K Y Y 40

121 GGTATTTCTGCAAGTCCAGCAGACATTATGCATCAGTTTTCTGATAATACAAAAGGAGAC 180
41 G I S A S P A D I M S H Q F F S T D N S T A K G D 60

181 CTGAATGAAATTGAATGGATGTTGGCAGCAAAGAAATTAGAATTAAGGTAAAGATTATA 240
61 L N E I E W M L A A K K L E L K V K I I 80

241 AAACAGCCTTTAACTCGATTGTCAATGATAACACTTCTGCTTTGGTGTGGTGTGATAAT 300
81 K Q P L T R L S M I T L P A L V W C D N 100

301 AAGCCCGATTTAGATCAAAATTTAACTCTCATTTTATACTAACTAAAATTGATGGGGTG 360
101 K P D L D Q N L N S H F I L T K I D G V 120

361 GGATCTGCTGCAAAATATCTCATCTACGATTTGATTGAGAATCGTCCATAATATTAGAT 420
121 G S A A K Y L I Y D L I E N R P I I L D 140

421 GCAAGTGAGTTTTCTGAAAGATATTCTGGTAAGTTAATGCTAGTAACTTCCCGTGCGTCA 480
141 A S E F S E R Y S G K L M L V T S R A S 160

481 ATATTGGGTTTCATTGGCTAAATTTGATTTTACTTGGTTTATTCCTGCGGTAATCAAATAT 540
161 I L G S L A K F D F T W F I P A V I K Y 180

541 CGTTATATTTTTTTGAAGTCATCGTTATTTTCAGTGGTGCTACAGATTTTTGCTCTGATT 600
181 R Y I F F E V I V I S V V L Q I F A L I 200

601 ACGCCATTGTTTTTTCAGGTTGTGATGGATAAGGTATTGGTGCATCGTGGTTTTTCTACT 660
201 T P L F F Q V V M D K V L V H R G F S T 220

661 CTGGATGTGGTAGCGATTGCCTTGTTGGTAGTAAGTTTATTTGAAGTCATTTTAAGTGGT 720
221 L D V V A I A L L V V S L F E V I L S G 240

721 CTACGCACTTATATTTTTGCTCATACAACCTCTCGAATTGATGTAGAGCTAGGAGCACGA 780
241 L R T Y I F A H T T S R I D V E L G A R 260

781 TTATTTTCGTCATCTATTAGCTCTACCGCTTGCTTATTTTGAGAGTAGAAGAGTAGGCGAT 840
261 L F R H L L A L P L A Y F E S R R V G D 280

841 ACAGTTGCACGTATACGTGAATTGGAACATATCCGCAATTTCTTAACTGGTCAAGCTCTC 900
281 T V A R I R E L E H I R N F L T G Q A L 300

901 ACTTCAGTTTTAGATTTGGTGTTTTCTTTTATATCTTGTTTGTAATGTGGTATTACAGC 960
301 T S V L D L V F S F I F L F V M W Y Y S 320



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FIG. 8-2

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961 CCTACTTTAACACTGGTAGTTTTGGCATCATTACCAATATATGCGTTTTGGTCTGCCTTT 1020
321 P T L T L V V L A S L P I Y A F W S A F 340

1021 ATTAGCCCAATTTTACGCACTCGACTAAATGATCAATTTGCACGCAATGCAGATAATCAA 1080
341 I S P I L R T R L N D Q F A R N A D N Q 360

1081 TCTTTTTTAGTGAAAGTATTACTGCGGTTGGTACGGTAAAAGCAATGGCAGTTGAACCT 1140
361 S F L V E S I T A V G T V K A M A V E P 380

1141 CAAATGACCCGCTCGCTGGGATAATCAATTAGCAGCTTATGTGGTTTCTAGTTTTCGGGTA 1200
381 Q M T R R W D N Q L A A Y V V S S F R V 400

1201 GCTAAGTTGGCAATGGTTGGGAGCAAGGAGTACAACCTCATTCAAAGATGGTTATTGTG 1260
401 A K L A M V G Q Q G V Q L I Q K M V I V 420

1261 GCAACTCTATGGATTGGTGCAAAATTGGTAATTGAAGGCAAGCTATCGGTAGGTCAATTA 1320
421 A T L W I G A K L V I E G K L S V G Q L 440

1321 ATAGCATTTAATATGCTGGCAGGTCAGGTGGCCGCTCCTGTTATCCGCCTGGCACAGCTA 1380
441 I A F N M L A G Q A A P V I R L A Q L 460

1381 TGGCAAGATTTTCAGCAAGTAGGTATTTAGTGGCGAGATTGGGTGATATTTAAATACT 1440
461 W Q D F Q Q V G I S V A R L G D I L N T 480

1441 CCAACTGAGCATTCTACATCTCGCTTAACCTTTACCTGATATTAAGGGTGATATTACATTT 1500
481 P T E H S T S R L T L P D I K G D I T F 500

1501 GAAATGTTGATTTTCGCTACAAAATAGATGGGCATTTAATATTACAGAATTTAAATTTA 1560
501 E N V D F R Y K I D G H L I L Q N L N L 520

1561 CAGATTAACGCTGGAGAGATACTAGGTATCGTAGGACGCTCTGGTTCAGGTAAATCAACA 1620
521 Q I N A G E I L G I V G R S G S G K S T 540

1621 TTGACAAAATTAGTACAGCGTTTATATGTACCAGAAAATGGGCGAATATTAGTTGATGGA 1680
541 L T K L V Q R L Y V P E N G R I L V D G 560

1681 AACGATTTGGCATTAGCTGATCCCGCTTGGCTGCGTCGCCAAGTGGGTGTTGTTTTGCAG 1740
561 N D L A L A D P A W L R R Q V G V V L Q 580

1741 GAAATGTGTTACTCAATCGTAGTATTCGAGATAATATTGCCCTAACTGATACGGGCATG 1800
581 E N V L L N R S I R D N I A L T D T G M 600

1801 TCATTAGAGTTTATTATCCAGGCTGCCAAGATGTCTGGGGCACATGACTTTATTATGGAA 1860
601 S L E F I I Q A A K M S G A H D F I M E 620

1861 TTGCCTGAGGGTTATGATACGATTGTTGGAGAGCAAGGTGCAGGCTTGTCAGGTGGACAA 1920
621 L P E G Y D T I V G E Q G A G L S G G Q 640



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FIG. 8-3

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1921 CGCCAGCGTATCGCTATTGCGCGTGCTTTAATTACCAATCCGCGTATTTTGATTTTGGAT 1980
641 R Q R I A I A R A L I T N P R I L I F D 660

1981 GAAGCTACTAGTGCATTAGACTATGAGTCGGAAAGGGCTATTATGCAAAATATGCAGGCA 2040
661 E A T S A L D Y E S E R A X A M Q N M Q A 680

2041 ATTTGCCAAGGTAGAACAGTGTGATTATTGCACATCGCTTATCTACCGTAAAAATGGCA 2100
681 I C Q G R T V L I I A H R L S T V K M A 700

2101 CATCGCATTATTGCAATGGACAAGGGGAAAATTGTAGAGCAAGGCACACATCAAGAATTG 2160
701 H R I I A M D K G K I V E Q G T H Q E L 720

2161 TTGCAAAAAGAAGATGGTTACTATCGTTATTTATATGATTTGCAGAATGGATAAA 2215
721 L Q K E D G Y Y R Y L Y D L Q N G *



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MbxB	-----MID	MAQPPAISA	QVLEAKMYG	TSASPADIM	QFSDNTKG	DNEIEMML	AAKKEEL	55
LktB	MEANQRND	L....GLVA	ETMEAGYHN	ISLNPEEK	HKFDIDGG	..S..TAWL	AAKSA	56
ApxB	MBFYRE.ED	M....GLYA	ETILAQYHN	FANPEELK	HKEDLEGK	..D..TANIL	AAKSEI	55
HlyB	MBSCHK.ED	M....GLYA	LETLAQYHN	MSWPEEK	HRFDIDGTG	..G..TSWLE	AAKSEI	55
MbxB	R/KITIKOPL	TRUSMETSP	ALWCDNKP	DLDQNLNSH	ELTKIDGV	GSAKKEIV	DLEENRP	116
LktB	KAKHIKKEI	SRLHLVNEP	ALWQDN..	.....GRH	ELLVKVD..	TNNRYKELV	NLEODAP	107
ApxB	KAKQVKKAI	DRJAFJALP	ALWRED..	.....GRH	ELTKID..	NEAKKKEIF	DLETHNP	106
HlyB	KVKGQVKKII	DRNEITSIP	ALVARED..	.....GRH	ELSEKVS..	KEANRYELIF	DLEQNP	106
MbxB	ITEDASEFS	ERISSEKME	MTSRASILG	SEAKFDETM	FIPAVIKYR	YEEFEMVIF	SVVIGEP	177
LktB	QKUSTDEFE	ACVGGQLTL	MTSRASWVG	QKAKEDFTM	FIPAVIKYR	KIFLETITV	SIFEGEP	168
ApxB	RUCQAEFE	SEVGGKTL	MASRASING	KKAKEDFTM	FIPAVIKYR	KIFLETITV	SIFEGEP	167
HlyB	RULEOSEFE	ALVGGHTLAL	TJASRSSVAG	KKAKEDFTM	FIPAVIKYR	REFIETELV	SVELQLE	167
MbxB	ALTPLEFFQ	VWMDKVLVH	RGESTEDAV	ATIALVMSL	FEMTSSGR	TYLFAHSTS	REPAVEG	238
LktB	ALTPLEFFQ	VWMDKVLVH	RGESTEDAV	EVAAIATL	FETVSSGR	TYLFAHSTS	REPAVEG	229
ApxB	ALTPLEFFQ	VWMDKVLVH	RGESTEDAV	EVAAIATL	FETVSSGR	TYLFAHSTS	REPAVEG	228
HlyB	ALTPLEFFQ	VWMDKVLVH	RGESTEDAV	EVAAIATL	FETVSSGR	TYLFAHSTS	REPAVEG	228
MbxB	APLEPHILCA	EPJANFESR	RUGDVAVR	RELEHTRNE	LTGOALTSV	DLVFSFSE	LPWNNV	299
LktB	APLEPHILCA	EPJANFESR	RUGDVAVR	RELEHTRNE	LTGOALTSV	DLVFSFSE	LPWNNV	290
ApxB	APLEPHILCA	EPJANFESR	RUGDVAVR	RELEHTRNE	LTGOALTSV	DLVFSFSE	LPWNNV	289
HlyB	APLEPHILCA	EPJANFESR	RUGDVAVR	RELEHTRNE	LTGOALTSV	DLVFSFSE	LPWNNV	289
MbxB	SPLEPHILCA	ASCHILAFM	SAFTSPILR	TRNDQFAR	NAQNGSELY	ESIVAVGEM	KAMAVIE	360
LktB	SPLEPHILCA	ASCHILAFM	SAFTSPILR	TRNDQFAR	NAQNGSELY	ESIVAVGEM	KAMAVIE	351
ApxB	SPLEPHILCA	ASCHILAFM	SAFTSPILR	TRNDQFAR	NAQNGSELY	ESIVAVGEM	KAMAVIE	350
HlyB	SPLEPHILCA	ASCHILAFM	SAFTSPILR	TRNDQFAR	NAQNGSELY	ESIVAVGEM	KAMAVIE	350

FIG. 9-1



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MbxB	QMTTRWDNG	LAAYVSSB	RYAKLAWG	QQGVQLIQ	MUIMATETW	GAKEVTEGK	LSVQQL	421
LktB	QMTDINDKQ	LASYVSSB	RYVFLATIG	QQGVQLIQ	TVVWJNEWE	GAHLVTSGD	LSVQQL	412
ApxIB	QMTNINDKQ	LASYVSSB	RYVFLATIG	QQGVQLIQ	VWVWJNEWE	GAHLVTSGD	LSVQQL	411
HlyB	QMTNINDKQ	LASYVSSB	RYVFLATIG	QQGVQLIQ	VWVWJNEWE	GAHLVTSGD	LSVQQL	411
MbxB	AFNMLAGOV	AAPVIRLAC	LWQDFQOQG	TSVIRLGD	LNJPTHEST	SRLTTPDILK	GDTEFEN	482
LktB	AFNMLAGOV	AAPVIRLAC	LWQDFQOQG	TSVIRLGD	LNJPTHEST	SRLTTPDILK	GDTEFEN	473
ApxIB	AFNMLAGOV	AAPVIRLAC	LWQDFQOQG	TSVIRLGD	LNJPTHEST	SRLTTPDILK	GDTEFEN	472
HlyB	AFNMLAGOV	AAPVIRLAC	LWQDFQOQG	TSVIRLGD	LNJPTHEST	SRLTTPDILK	GDTEFEN	472
MbxB	VDERYKIDG	HLTQNLNL	QINAGEILG	TVGRSGSGK	STLTKLQVR	LMPENGRIT	LVGDNDL	543
LktB	TRERYKIDG	HLTQNLNL	QINAGEILG	TVGRSGSGK	STLTKLQVR	LMPENGRIT	LVGDNDL	534
ApxIB	TRERYKIDG	HLTQNLNL	QINAGEILG	TVGRSGSGK	STLTKLQVR	LMPENGRIT	LVGDNDL	533
HlyB	TRERYKIDG	HLTQNLNL	QINAGEILG	TVGRSGSGK	STLTKLQVR	LMPENGRIT	LVGDNDL	533
MbxB	ALADPNWLR	ROVGVWLOD	NVLNRSIR	DNJALADPG	MSTEFILQA	AKMSSGANDF	IMELEPEG	604
LktB	ALADPNWLR	ROVGVWLOD	NVLNRSIR	DNJALADPG	MSTEFILQA	AKMSSGANDF	IMELEPEG	595
ApxIB	ALADPNWLR	ROVGVWLOD	NVLNRSIR	DNJALADPG	MSTEFILQA	AKMSSGANDF	IMELEPEG	594
HlyB	ALADPNWLR	ROVGVWLOD	NVLNRSIR	DNJALADPG	MSTEFILQA	AKMSSGANDF	IMELEPEG	594
MbxB	YNTLVGEQG	AGLSGGGRC	RIATARALI	INRKLIFED	EATSALDYE	SERATQNM	QATQQR	665
LktB	YNTLVGEQG	AGLSGGGRC	RIATARALI	INRKLIFED	EATSALDYE	SERATQNM	QATQQR	656
ApxIB	YNTLVGEQG	AGLSGGGRC	RIATARALI	INRKLIFED	EATSALDYE	SERATQNM	QATQQR	655
HlyB	YNTLVGEQG	AGLSGGGRC	RIATARALI	INRKLIFED	EATSALDYE	SERATQNM	QATQQR	655
MbxB	STVKNADRI	STVKNADRI	STVKNADRI	STVKNADRI	STVKNADRI	STVKNADRI	STVKNADRI	717
LktB	STVKNADRI	STVKNADRI	STVKNADRI	STVKNADRI	STVKNADRI	STVKNADRI	STVKNADRI	708
ApxIB	STVKNADRI	STVKNADRI	STVKNADRI	STVKNADRI	STVKNADRI	STVKNADRI	STVKNADRI	707
HlyB	STVKNADRI	STVKNADRI	STVKNADRI	STVKNADRI	STVKNADRI	STVKNADRI	STVKNADRI	707

FIG. 9-2



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FIG. 10

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1	ATGACGAAAAAGTTTGCAGAGCTAGGTTTAATTGCATGGCTTTGGTCTAACTCTGATATG	60
1	M T K K F A E L G L I A W L W S N S D M	20
61	CATAAACATTGGACGTTGTCTTTGTTTGGACCAATGTTATTCGGCAATTGAGACAGGT	120
21	H K H W T L S L F A T N V I P A I E T G	40
121	CAATATGTTATATTGAAAAGAGAAGATATGCTGTAGCATAATTGAGTGGGCTAAACTT	180
41	Q Y V I L K R E D M P V A Y C S W A K L	60
181	AGTTTAGAAAACGAGGTTAAATATATTAACGATGTTACTTCTCTTAAGTTAGATGACTGG	240
61	S L E N E V K Y I N D V T S L K L D D W	80
241	CAGTCAGGTGACCGAAACTGGTTTATTGACTGGATTGCTCCATTTGGCGATAGTCTTACA	300
81	Q S G D R N W F I D W I A P F G D S L T	100
301	CTCACAAAACACATGAGAACGTTATTTTCAGATGAATTGTTTAGAGCGATTCTGTAGAT	360
101	L T K H M R T L F S D E L F R A I R V D	120
361	GGAAATTCATCGCATGGTAAGATATCTGAATTTTATGGAAAGTCTGTTGATTCAAATAA	420
121	G N S S H G K I S E F Y G K S V D S K L	140
421	GCCTCAAGAATATTTGCACAATATCACGAAGATTTGACGAGCAAATTGTCAACTCAGAAT	480
141	A S R I F A Q Y H E D L T S K L S T Q N	160
481	AATTTTATTATATCTAAAGATAATTAA	507
161	N F I I S K D N *	169



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MbxC	---	MTKKFAE	EGJIAJMSN	SOMKHMLES	LFATNYIPAT	ETGOY	42
LkTC	---	MNQSYENL	CGNITNLMN	SSLEKESCE	LFATNYIPAT	ENEROY	43
ApXIC	MSK	KINGEEV	EGEVAHWAAS	SPERKAPLES	LFATNYIPAT	ESNOY	45
HLYC	---	MNRNPLEW	EGHVSJUEWAS	SPLEHNEVVS	LFATNYIPAT	RANQY	44
MbxC	WIL	KREDMBV	AYCSWAKESC	ENEKYLINBV	TSEKLDIMOS	GDRNW	87
LkTC	ML	GDNGIRI	AYCSWADENE	ETEKVOTKDI	NSLTPEDKOS	GDRNW	88
ApXIC	WIL	KROGFRI	AFCSWANONE	ENEKYLIDV	ASVADDTIS	GDRNW	90
HLYC	AL	TRBNYAV	AYCSWANISE	EXEKYLIDV	TSEKLEDMTES	GDRKW	89
MbxC	FID	WIAPFGD	SLTETKMBRT	LESDELFRAT	RVGNSS.HG	KJSEF	131
LkTC	ITD	WAPFGH	SOLLKXKMCQ	KTPDMIMRSI	REYFKOKELG	KIAYE	133
ApXIC	FID	WAPFGD	SALTKHMRD	NEFNELEFRAT	RVBPDSR.HG	KJSEF	134
HLYC	FID	WIAPFGD	NGALXKMRK	KEPDELEFRAT	RVBPETH.HG	KVSEF	133
MbxC	YKS	VBKSLA	SRIIAQYHED	TSKESTONN	FTISKDN	168	
LkTC	KGG	LBKITA	KKRIDTYCEE	DATAEKNEFN	EKK---	167	
ApXIC	HGG	LBKSLA	SKTFOOTHE	EMSELKXKON	TKESLWNS	172	
HLYC	HGG	LBKSLA	NKFKOTHE	ITIEVANKSD	FNESLIG-	170	

FIG. 11



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FIG. 12-1

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```
1 ATGTTTATACAAGCACTTAAAGATTTTTTTATTCGCTATATAACCGTTTGGCGCAATACA 60
1 M F I Q A L K D F I R Y I T V W R N T

61 TGGGCAGTTCGAGACCAACTAACCCTCCTAAGCGTACTAAAGAAGAACTCGCTTTTCTT 120
21 W A V R D Q L T P P K R T K E E L A F L 40

121 CCTGCACATCTAGAACTCACTGACACACCTGTATCCAGATCTTCTAAGTGGACAGCTAGA 180
41 P A H L E L T D T P V S R S S K W T A R 60

181 ATAATCATGATATTTGTCCTATTTGCTTTGCTATGGTCTTGGGTTGGACAGATTGACATT 240
61 I I M I F V L F A L L W S W V G Q I D I 80

241 GTTGCTACAGCTTCAGGTAAAATTTCTTCAGGTAGCCGTAGCAAGACTATTCAATCTTTG 300
81 V A T A S G K I S S G S R S K T I Q S L 100

301 GAAACAGCGATAGTTAAAGCAGTTTATGTACGTGATGGTCAAAATGTTCAACAAGGTGAA 360
101 E T A I V K A V Y V R D G Q N V Q Q G E 120

361 ATATTAGTAGATTTAGTGGGAATCGGTTTCAGATAGTGATGTTGCTCAGTCCGAGAAAGCC 420
121 I L V D L V G I G S D S D V A Q S E K A 140

421 CTTGAGCAGCGCAATTATCTAAGCTACGCCTGAAGCAATTTTATCAGCATTAAATCAC 480
141 L R A A Q L S K L R L E A I L S A L N H 160

481 CGTATTAATCCTCAGATTGATGTAGCATATGCAAAGTCTTTAAATATTTTCAGAATCGGAA 540
161 R I N P Q I D V A Y A K S L N I S E S E 180

541 ATTAATGAAGCTCAAACTTTAGCCCAAAATCAATATCAAGCATGGTTAGCACAGATGAA 600
181 I N E A Q T L A Q N Q Y Q A W L A Q D E 200

601 CAACTAAAATTAACCTTAAAGGACATCAAGCAGAATTACAATCTGCTCGATCCCAAGAA 660
201 Q L K L T L K G H Q A E L Q S A R S Q E 220

661 CAAAAGTTGGTTTCAGTTGGTGCAATTGAACATCAAAAGACTGATGATTATCGGAGTCTC 720
221 Q K L V S V G A I E H Q K T D D Y R S L 240

721 AAAGCAGAAAATTTTATATCTGAGCATGCTTATCTAGAACAAGAAAGCAAATTACTTAGC 780
241 K A E N F I S E H A Y L E Q E S K L L S 260

781 AATCAAAATGATTTACAAAGTACACGTAGTCAGATTCAAAAAATACAGGCTGCAATCATG 840
261 N Q N D L Q S T R S Q I Q K I Q A A I M 280

841 CAAGCTGAACAGAACCGTATGTTATATACTCAAAATCTAAAACGTGATACATTAGAATCT 900
281 Q A E Q N R M L Y T Q N L K R D T L E S 300

901 TTACGCCAAACCAATGAACAGATTAATCAATATACTGGTCAAACCTAATAAAGCTAAGCAG 960
301 L R Q T N E Q I N Q Y T G Q T N K A K Q 320
```



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FIG. 12-2

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961 CGACAGAAATTGCTGAGTATTAATCACCTGTTAATGGTACTATACAAGAGCTAACAGCT 1020
321 R Q K L L S I K S P V N G T I Q E L T A 340

1021 TATACTTTAGGTGGAGTTGTACAAGCAGCACAAAAATTATGGTTGTGGCACCTAACGAT 1080
341 Y T L G G V V Q A A Q K I, MAY V A P N D 360

1081 AATCAAGTGAAGTAGAGGTATTAGTGCTAAATAAAGATATCGGCTTTGTAAAAGCTGGG 1140
361 N Q V E V E V L V L N K D I G F V K A G 380

1141 CAGAATGTTATCATCAAAATCGAGAGTTTTCTTATACACGTTATGGTTATTTAACAGGT 1200
381 Q N V I I K I E S F P Y T R Y G Y L T G 400

1201 AAAATAAAAAGTATTAGTCATGATGCTATAGAACATCAACATTTAGGTCTAGTGTATACT 1260
401 K I K S I S H D A I E H Q H L G L V Y T 420

1261 GCACTTGTTTCTCTTGATAAAAGCACATTAAATATAGATGGAGTAACAATCAACTTAACG 1320
421 A L V S L D K S T L N I D G V T I N L T 440

1321 CCAGGAATGAATGTTACTGCTGAAATTAACAGGTAAACGTCGTGTTTGGATTATATA 1380
441 P G M N V T A E I T G K R R V L D Y I 461

1381 TTAAGTCCATTGCAGACAAAAGTTGATGAAAGTTTTCGAGAACGCTAA 1428
461 L S P L Q T K V D E S F R E R * 476



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FIG. 13-1

MbxD	~MFTQALKD	FFIRYIFRWIR	NEMAVRDQIT	PKRTKEELA	SEPAHEUID	48
Lktd	MKTJMSGTYE	FFERYKNIWA	EWVKTKEELD	HNRKIDASE	FLPAHEEET	50
ApxD	MKTJLMGLYE	FFQRYKFWIT	EJMKIRHQED	TPDREKDENE	FLPAHEETE	50
HlyD	MKTJLMGFSE	FLRYKLIWS	EJMKIRKOLD	TPVREKDENE	FLPAHEETE	50
MbxD	TPVSRSSKWT	ARTJMTIRVLF	AELWSWGOI	DIYATASGKI	SSGSRSKTIQ	98
Lktd	TPVSKRPRLT	AYLTMELFW	ATVJASNSKM	EIVATAPGKI	TFSGRSKEIK	100
ApxD	TPVSKRPRLT	AYLTMELFW	ALVTSISSHM	EIVATATGKI	AESDRSKEIK	100
HlyD	TPVSRPRRLV	AYFLMGFLVI	AFILSVLGQV	EIVATANGKI	FLSGRSKEIK	100
MbxD	SLEITATKAV	YVRDGGNWQO	GETJVDVIGI	GSDSIVAQSE	KAIRAQESK	148
Lktd	PTENATVOET	EVKDGQFVEK	GOLJVSJTAI	GSDADIKTM	ASLSEAKEN	150
ApxD	PTENALVRET	EVQDGOFEYK	DOJLHLTAI	GADADQOKIK	SSLSSEIKER	150
HlyD	PTENSIVKET	INKEGESVRK	GDVJLKLTAL	GAEDITLKIQ	SSJLQARLEQ	150
MbxD	LRLLEATISAL	NHRINPQIDV	AYAKSLNIG	ESEINEAQT	AQOQVQAMLA	197
Lktd	YRYQTELTAT	EKESIFVIDU	.SRTEKDS	EEDRERIKHI	HEEQVTTWOK	199
ApxD	YRYEELLEAV	AADRPLIEL	.TKDEKHA	EEDKTRIRYL	ITEQFEAWOK	199
HlyD	TRYQENSRSE	ELNKJPELKE	PDEPYFQNV	EEEVBLITS	IKEQFSTWON	200
MbxD	QDEQLKITEK	GHOALQSAR	SQEQALVSIG	AIEHQKTDY	RSEKAENFIS	247
Lktd	QTRKTLAYK	RKEAKQITF	ANVRKVEGAT	RILQEKKOF	KALYKQKSL	249
ApxD	QXQXKELAQ	RREAKQIM	ANVRKVEGAT	AVENERIKOL	KKLFNSKSL	249
HlyD	QXQXKSLND	KKRAERITL	APVRKVENW	RVKESREDJ	RSLHKQALJA	250
MbxD	ERAYLEQESK	ILSNQNDIOS	TRSGRQKTOA	ATMQAEQNRM	AVTQNLKRIT	297
Lktd	KHELLAQENK	LTERONAVAV	VRSKENLEN	BLNVKEELE	LTTOFFSSDY	299
ApxD	KHDLITQENR	HESAVNELAV	YKSRNEVES	BLRVKKEIH	LTTOFFRADT	299
HlyD	KHAYLEQENK	YVEANERIV	YKSQLEQTES	EIESAKQBYQ	LVTOLEKNEI	300



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FIG. 13-2

MbxD	ESLROINBO	INQITGQTNK	AKQROKLLSI	KSRVINGTIOE	ETATITLGGWV	347
Lktd	LEKIKQHIN	ERQIPRELEK	NNORROASV	RAPVSGEVQO	LXTHITGGWV	349
ApxD	LEKIKONVEA	EKQISLELEK	NEORQIJASV	RAPVSGEVQO	LXTHITGGWV	349
HlyD	DKERQITDS	IELLELELEK	NEERQOASV	RAPVSGEVQO	LEVHEEGGWV	350
MbxD	QATQKIMWA	PNNQVIEVEV	MLNKQIGEV	KACQWVETKL	ESERVTRYGV	397
Lktd	TAETLMITIV	PEDDVLEATA	LYPNKQIGEV	AAGQEVLEKV	ETEPVTRYGV	399
ApxD	TAETLMNIA	PEDDVLEATA	LTQNKQIGPI	EVGDANJLKV	ETEPVTRYGV	399
HlyD	TAETLMNIV	PEDDVLEATA	LYONKQIGFI	NVGQVLETKV	EAEPVTRYGV	400
MbxD	LGKIKSIESH	DATERQHLEGI	KVITALEVSLDK	SEEN.IDAVT	INETPBMNKT	446
Lktd	LTGRITKHTSP	DATERQPNVGL	VENATIAEDR	KNULTSPBQK	EDLESSGNTLT	449
ApxD	LVGKVNITTE	EATERNPQLEGI	VANSETEDOR	KYESGKEGKE	TEGGGMSLT	449
HlyD	LVGKVNINL	DATERQKLEGI	VEBIVNSVEE	NDEST.GNKH	TEPSSGMAVE	449
MbxD	AEIKTGKRRV	LDVII.SPLQT	KVDESFRER			475
Lktd	AEIKTGERSV	MSXLTSPLEF	SUTPFRER			478
ApxD	AEIKTGERSV	TSYELSPLEF	SVSESSER			478
HlyD	AEIKTGERSV	TSYELSPLEF	SVSESSER			478



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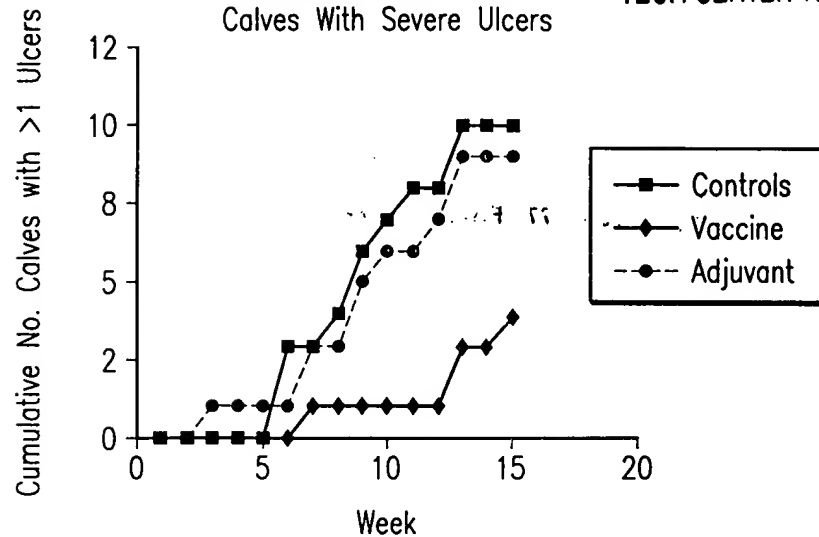
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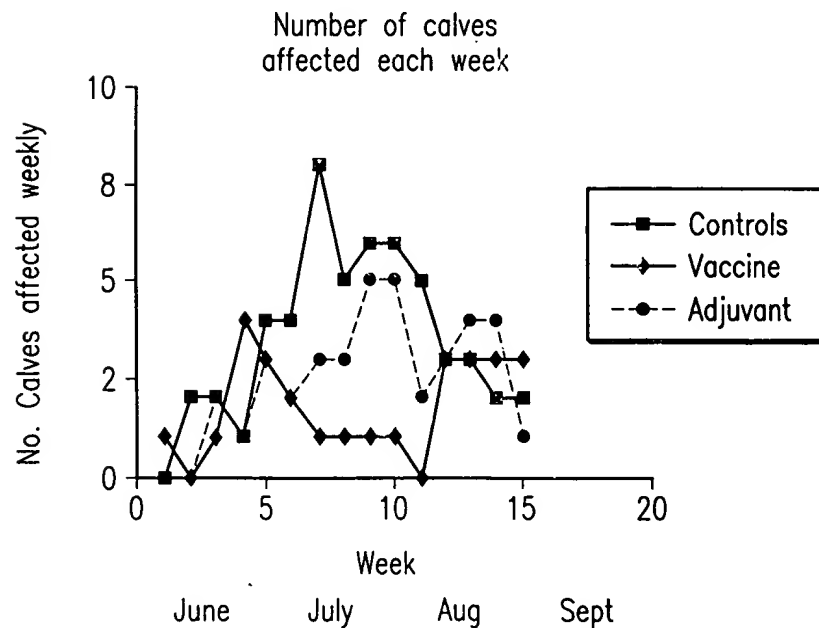
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Cumulative Number of
Calves With Severe Ulcers



Number of calves with ulcers with clinical scores >+2

FIG. 14



Number of calves affected weekly in 1 group of vaccinated calves and in controls.

FIG. 15



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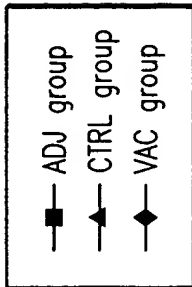
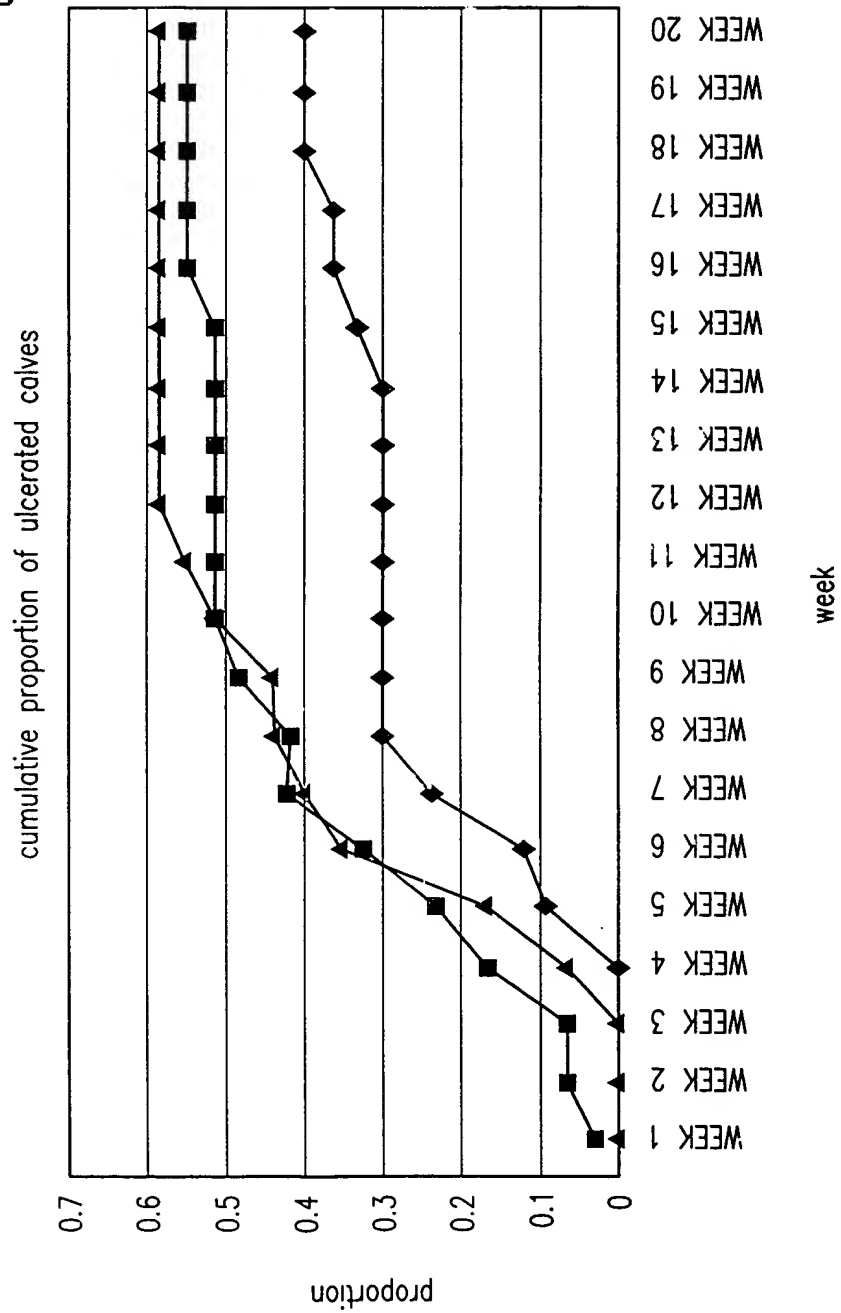


FIG. 16



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